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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/734,086	12/11/2003	Charles M. Lieber	H0498.70203US01	7978

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EXAMINER

MENEFEE, JAMES A

ART UNIT PAPER NUMBER

2828

DATE MAILED: 10/27/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/734,086	Applicant(s) LIEBER ET AL.	
	Examiner James A. Menefee	Art Unit 2828	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 August 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 38-89,108-112,114-123 and 126-129 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 38-89,108-112,114-123 and 126-128 is/are allowed.
- 6) ☒ Claim(s) 129 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|----------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date: _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>8/10/06</u> . | 6) <input type="checkbox"/> Other: _____ |

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DETAILED ACTION

Response to Amendment

By amendment filed 8/10/2006, claims 1-37, 90-107, 113, and 124-125 are cancelled, and claims 66, 108, 114, 117, 126, and 127 are amended. Claims 38-89, 108-112, 114-123, and 126-129 are pending.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claim 129 is rejected under 35 U.S.C. 102(e) as being anticipated by Majumdar et al. (US 6,996,147).

Majumdar discloses a device comprising a substrate and a nanoscale wire electrical injection laser integrated with the substrate. See Example 7, cols. 28-32, and col. 32 lines 25-29. In these sections Majumdar discusses a nanoscale wire laser on a substrate and further describes it may be electrically pumped.

Allowable Subject Matter

Claims 38-89, 108-123, and 126-128 are allowed.

Regarding claims 38-89, there is not taught or disclosed in the prior art as in independent claim 38 an apparatus comprising a nanoscale wire that generates amplified stimulated emission of radiation, and a substrate, where carrier types are injected along at least a portion of a length of the wire in response to an electric signal from the substrate to facilitate said generation.

Note Majumdar, cited previously, discloses a nanoscale wire laser on a substrate that may be electrically injected (Example 7, col. 32 lines 25-29), and also a nanoscale wire electrically injected via electrodes, but apparently not on a substrate. While Fig. 32 shows that carriers may be injected along at least a portion of a length of the wire (under the electrodes), such injection is not in response to an electric signal from a substrate. In this sense, it is not believed that the electrode may be interpreted to be a substrate. Further, even if electrical injection were done from a substrate in, for example, Fig. 43, such injection would occur only at an end of the wire. Thus the injection would not be along at least a portion of a length of the wire. Note Fig. 43 is discussed in Example 7, cols. 28-32, and said example is disclosed as allowing for electrical injection, col. 32 lines 25-29.

Regarding claims 108-116, there is not taught or disclosed in the prior art a method of fabricating a nanoscale laser comprising forming a nanoscale wire optical cavity from a first type semiconductor and coupling to at least one electrode formed from a second type semiconductor, the electrode formed in a semiconductor layer coupled to a substrate. Again, Majumdar lacks the electrode and the substrate, particularly the electrode being of a type different from the wire.

Regarding claims 117-123, there is not taught or disclosed in the prior art a method of fabricating a nanoscale wire optical cavity where a Bragg grating is formed on a nanoscale wire and the wire is positioned on a substrate such that carriers can be injected from the substrate into

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at least a portion of the wire. Majumdar only discusses the Bragg grating with respect to Example 6 (see col. 26 lines 55-56 (DFB laser)). The part of example 6 discussing electrical injection is shown in Fig. 32 and, as noted above, there is apparently no substrate involved in this example, nor is there any suggestion of modifying the device to include one.

Regarding claim 126, similarly to claim 38, there is not taught or disclosed in the prior art a method of generating amplified stimulated emission of radiation comprising applying an electrical signal from a substrate along at least a portion of a length of a nanoscale wire.

Regarding claims 127-128, similarly to claim 38, there is not taught or disclosed in the prior art an electrical injection laser including a nanoscale wire that receives carriers from a substrate along at least a portion of a length of the nanoscale wire.

Note that several references, particularly Duan et al. (Nature, Jan. 2001, cited previously) and Gudikson et al. (Nature, Feb. 2002, cited previously), disclose electrically injected nanoscale optical devices that seem to provide injection to the device via a substrate, similar to the manner claimed. These references, however, only contemplate that possibly one could form lasers in a similar manner in the future; in light of this hope for the future, there is no suggestion that such references are enabling of lasers formed in this way.

Response to Arguments

Applicants arguments filed 8/10/2006 have been fully considered but are not wholly persuasive.

First it should be noted that applicant misread the prior office action concerning Majumdar's teaching of a substrate. Applicant states that the action "points to Col. 7, lines 28-32

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of Majumdar to support a substrate.” Response at 13. It is conceded that this section has little to do with a substrate. But the prior action, at page 5 lines 1-2, pointed to example 7 cols. 28-32 to support a nanoscale wire laser integrated with a substrate.

This section, it is believed, speaks for itself and sufficiently supports the examiner’s anticipation rejection of a nanoscale wire electrical injection laser integrated with a substrate, as required in claim 129. Thus, regarding claim 129, applicant’s argument that Majumdar does not teach a nanoscale wire the responds to an electrical signal from the substrate lacks merit, due to the fact that Majumdar claim 129 requires only the wire is integrated with the substrate, with no requirement as to an electrical signal from the substrate.

Applicant’s arguments as to the remaining claims are persuasive to the extent that injection occurs via a substrate. See the reasons for allowance herein for more on this point.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

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however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James A. Menefee whose telephone number is (571) 272-1944.

The examiner can normally be reached on M-F 8:30-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, MinSun Harvey can be reached on (571) 272-1835. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



James Menefee
October 25, 2006